

## **REMARKS**

Applicant is in receipt of the Office Action mailed March 17, 2005.

Claim status is:

Claims 1-38 were pending in the application prior to entry of the present amendment.

Claims 1-6, 8, 13-14, 20, 22, 25, 27, 33, 35, and 38 are herein amended.

Claims 11-12, 18-19, 29, and 31 have been canceled.

New claims 39-41 have been added.

Claims 1-10, 13-17, 20-28, 30, and 32-41 are now pending.

### **Rejections Under Section 112**

Claims 1-38 were rejected under section 112, because the specification “does not reasonably provide enablement for calculating partial sums”, since “only addition operations are specifically performed”. These rejections are traversed since the specification clearly defines a multiplication step to form weighted samples on page 22, lines 28-31:

“Partial sums for each parameter value include 1) a sum of weighted sample values (sum of the products of each sample value and a determined weight for the location of each sample) and 2) a sum of the weights determined for the location of each sample.”

Claims 1-38 were also rejected under section 112, for the use of the term “convolution kernel”. “The term is indefinite because the specification does not redefine the term.” These rejections are traversed since the specification clearly defines a “convolution kernel” on page 3, lines 1-6:

“The samples to be considered are all the samples that are within a convolution kernel corresponding to a pixel. The convolution kernel is bounded by an array of pixel regions (sample bins) in sample space (typically a 5 by 5 array of sample bins). Those samples that lie outside the convolution kernel (also referred to as the filter boundary), but within the bounding array of sample bins may be assigned a weight of zero or may be excluded from the filtration calculations.”

Claim 3 was rejected under section 112, for the use of the term “finely” which is “a relative term that renders the claim indefinite”. Claims 3, 22, and 33 have been amended to delete the term “finely”.

Claims 5-38 were also rejected under section 112, for the use of the term “a chain”. Those claims that used the term have been amended to delete the word “chain”.

Claims 1-7 were also rejected under section 112, because the specification “does not provide a complete, operative device” in that “convolution operations require multiplication”. These rejections are traversed since Figure 3 clearly shows a filter tree (840) as part of the convolve subsystem of the sample manager. It is well known in the art, that a filter tree comprises both adders and multipliers.

#### **Allowable Subject Matter**

The Examiner states in the current Office Action: that claims 12, 16, 19-20, 28-29, and 31 would be allowable if rewritten to overcome the 112 rejections and include all of the limitations of the base claim and any intervening claims.

Claim 8 has been amended to include the limitations of claims 11 and 12.

Claim 14 has been amended to include the limitations of claims 18 and 19.

New claim 39 has been written to include the limitations of claims 14, 15, and 16.

New claim 40 has been written to include the limitations of claims 25, 27, and 29.

New claim 41 has been written to include the limitations of claims 25, 30, and 31.

Therefore, claims 8-10, 13-17, 20, and 39-41 are allowable.

### **Rejections Under Section 103**

Independent claim 1 was rejected under 35 U.S.C. §103(a) as being unpatentable over Cloutier (USPN 5892962) in view of Choi et al. (USPN 5742349; hereinafter referred to as Choi).

Independent claims 1, 8, and 14 were rejected under 35 U.S.C. §103(a) as being unpatentable over Cloutier in view of Choi as applied to claim 1, and further in view of McCanny et al. (USPN 4885715; hereinafter referred to as McCanny).

Independent claims 21, 23, and 25 were rejected under 35 U.S.C. §103(a) as being unpatentable over Cloutier in view of McCanny, and further in view of Inada et al. (US 2004/0004620; hereinafter referred to as Inada).

Dependent claims 2-7, 9-11, 13, 15, 17-18, 22, 24, 26-27, 30, and 32-38 were rejected under 35 U.S.C. §103(a) as being unpatentable over various combinations of Cloutier, Choi, McCanny, and Inada.

Claim 1 as amended recites:

A system for generating pixels from a distributed convolution of samples comprising:

a plurality of sample managers connected in series; and

a set of partial sums buses, wherein each partial sums bus connects one of the sample managers of the series to the next sample manager in the series;

wherein each sample manager is operable to calculate partial sums for a corresponding portion of the samples located within a convolution kernel corresponding to a pixel location, wherein the partial sums comprise 1) a sum of weights determined for locations of the samples in the portion of samples and 2) a sum of weighted sample values for the portion of samples,

wherein each of the second through the last sample manager in the series is operable to add the partial sums calculated for its corresponding portion of the samples to any previously accumulated partial sums received from the prior sample manager in the series, and if not the last sample manager in the series, output new accumulated partial sums to the next sample manager in the series.

Neither Cloutier, Choi, or McCanny either singly or in combination teach a system of:

**“a plurality of sample managers connected in series”...“wherein each of the second through the last sample manager in the series is operable to add the partial sums calculated for its corresponding portion of the samples to any previously accumulated partial sums received from the prior sample manager in the series, and if not the last sample manager in the series, output new accumulated partial sums to the next sample manager in the series”.**

In fact, Cloutier teaches away from a series process with consistent references to parallel processing architecture:

In the abstract: “The multiprocessor may be programmed to function as a single-instruction, multiple-data (SIMD) **parallel processor** having a matrix of processing elements (PEs), where each FPGA may be programmed to operate as a submatrix array of PEs.”

In the Field of the Invention in column 1, lines 5-6: “The present invention relates to **computer architecture for parallel processors.**”

In the claims in column 10, lines 18-32 and 35-37:

1. A multiprocessor comprising:

(a) a multidimensional array of field programmable gate arrays (FPGAs), each FPGA having local memory;

(b) a process controller, connected to the array of FPGAs; and

(c) an input/output (I/O) controller, connected to the array of FPGAs and to the process controller, wherein:

the array of FPGAs is adapted to be programmed as a matrix of processing elements (PEs), wherein each FPGA in the array corresponds to two or more PEs; the process controller is adapted to control processing implemented by the PEs; and

the I/O controller is adapted to control data flow into and out of the PEs and the process controller.”

“3. The invention of claim 1, wherein the process controller is a single-instruction, multiple-data (SIMD) controller adapted to **control parallel processing by the PEs.**”

Cloutier does not teach series processing where a computation of one PE is transferred to another PE for further processing. In fact, this would be contrary to the purpose of a parallel processing architecture.

Figure 6 of Choi clearly shows that a first unit including the MUX (212) **does not output partial sums to a second unit** including the MUX (216) for further processing, but instead, both the first and second units send their output to a sum unit (234) that sums their outputs.

Similarly, McCanny does not teach series processing. Column 4, lines 40-50 of McCanny states:

“FIG. 1 is a block diagram of a logic cell array for a processor of the invention; ....FIG. 5 is a block diagram of an accumulator device for accumulating partial sums generated by the FIG. 1 array”.

Each column of the logic cell array sends an output to the accumulator device, but FIG. 5 clearly shows the outputs are added together in a row of adders 80a or 80b. The output of the first column of the logic cell array is not sent to the next column for further processing.

Therefore, Applicant submits that claim 1 and its dependent claims are non-obvious and patentably distinguished over Cloutier, Choi, and McCanny for at least the reasons given above.

Applicant further submits that the independent claims 21, 23, and 25 and their dependent claims are also non-obvious and patentably distinguished over Cloutier, Choi, and McCanny for at least the reasons given above in support of claim 1.

## CONCLUSION

Applicant submits the application is in condition for allowance, and an early notice to that effect is requested.

If any extensions of time (under 37 C.F.R. § 1.136) are necessary to prevent the above referenced application(s) from becoming abandoned, Applicant(s) hereby petition for such extensions. If any fees are due, the Commissioner is authorized to charge said fees to Meyertons, Hood, Kivlin, Kowert & Goetzel PC Deposit Account No. 50-1505/5681-59700/JCH.

Also enclosed herewith are the following items:

☒ Return Receipt Postcard

Respectfully submitted,



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